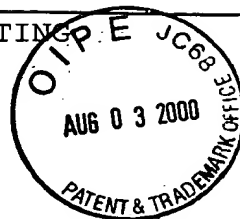


SEQUENCE LISTING



<110> LONGACRE-ANDRE, SHIRLEY  
ROTH, CHARLES  
BARNWELL, JOHN  
MENDIS, KAMINI  
NATO, FARIDABANO

<120> RECOMBINANT PROTEIN CONTAINING A C-TERMINAL FRAGMENT OF  
PLASMODIUM MSP-1

<130> 0660-0139-OXPCT

<140> 09/125,031

<141> 1999-03-10

<150> PCT/FR97/00290

<151> 1997-02-14

<150> FR96/01822

<151> 1996-02-14

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<170> PatentIn Ver. 2.1

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<211> 291

<212> DNA

<213> Artificial Sequence

<220>

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<220>

<221> CDS

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Glu	Phe	Asn	Ile	Ser	Gln	His	Gln	Cys	Val	Lys	Lys	Gln	Cys	Pro	Glu	
1				5				10					15			

aac	tct	ggc	tgt	ttc	aga	cac	ttg	gac	gag	aga	gag	gag	tgt	aaa	tgt	96
Asn	Ser	Gly	Cys	Phe	Arg	His	Leu	Asp	Glu	Arg	Glu	Glu	Cys	Lys	Cys	
			20					25					30			

ctg	ctg	aac	tac	aaa	cag	gag	ggc	gac	aag	tgc	gtg	gag	aac	ccc	aac	144
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Leu	Leu	Asn	Tyr	Lys	Gln	Glu	Gly	Asp	Lys	Cys	Val	Glu	Asn	Pro	Asn		
		35					40					45					
ccg	acc	tgt	aac	gag	aac	aac	ggc	ggc	tgt	gac	gca	gac	gcc	aaa	tgc	192	
Pro	Thr	Cys	Asn	Glu	Asn	Asn	Gly	Gly	Cys	Asp	Ala	Asp	Ala	Lys	Cys		
	50					55					60						
acc	gag	gag	gac	tcg	ggc	agc	aac	ggc	aag	aaa	atc	acg	tgt	gag	tgt	240	
Thr	Glu	Glu	Asp	Ser	Gly	Ser	Asn	Gly	Lys	Lys	Ile	Thr	Cys	Glu	Cys		
	65				70				75						80		
acc	aaa	ccc	gac	tcg	tac	ccg	ctg	ttc	gac	ggc	atc	ttc	tgc	agc	taa	288	
Thr	Lys	Pro	Asp	Ser	Tyr	Pro	Leu	Phe	Asp	Gly	Ile	Phe	Cys	Ser			
				85					90					95			
taa																291	

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B2  
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Glu	Phe	Asn	Ile	Ser	Gln	His	Gln	Cys	Val	Lys	Lys	Gln	Cys	Pro	Glu		
1				5				10					15				
Asn	Ser	Gly	Cys	Phe	Arg	His	Leu	Asp	Glu	Arg	Glu	Glu	Cys	Lys	Cys		
		20						25					30				
Leu	Leu	Asn	Tyr	Lys	Gln	Glu	Gly	Asp	Lys	Cys	Val	Glu	Asn	Pro	Asn		
		35					40					45					
Pro	Thr	Cys	Asn	Glu	Asn	Asn	Gly	Gly	Cys	Asp	Ala	Asp	Ala	Lys	Cys		
	50					55					60						
Thr	Glu	Glu	Asp	Ser	Gly	Ser	Asn	Gly	Lys	Lys	Ile	Thr	Cys	Glu	Cys		
	65				70				75						80		
Thr	Lys	Pro	Asp	Ser	Tyr	Pro	Leu	Phe	Asp	Gly	Ile	Phe	Cys	Ser			
				85					90					95			

<210> 3  
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 catttagatg aaagagaaga atgtaaatgt ttattaaatt acaacaaga aggtgataaa 120

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tgtgttgaaa atccaaatcc tacttgtaac gaaaataatg gtggatgtga tgcagatgcc 180
aaatgtaccg aagaagattc aggtagcaac ggaaagaaaa tcacatgtga atgtactaaa 240
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<210> 4

<211> 354

<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence:SYNTHETIC

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<221> CDS

<222> (1)..(354)

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Glu Phe Asn Ile Ser Gln His Gln Cys Val Lys Lys Gln Cys Pro Glu
  1             5             10             15

aac tct ggc tgt ttc aga cac ttg gac gag aga gag gag tgt aaa tgt 96
Asn Ser Gly Cys Phe Arg His Leu Asp Glu Arg Glu Glu Cys Lys Cys
          20             25             30
B2
cont.

ctg ctg aac tac aaa cag gag ggc gac aag tgc gtg gag aac ccc aac 144
Leu Leu Asn Tyr Lys Gln Glu Gly Asp Lys Cys Val Glu Asn Pro Asn
  35             40             45

ccg acc tgt aac gag aac aac ggc ggc tgt gac gca gac gcc aaa tgc 192
Pro Thr Cys Asn Glu Asn Asn Gly Gly Cys Asp Ala Asp Ala Lys Cys
  50             55             60

acc gag gag gac tcg ggc agc aac ggc aag aaa atc acg tgt gag tgt 240
Thr Glu Glu Asp Ser Gly Ser Asn Gly Lys Lys Ile Thr Cys Glu Cys
  65             70             75             80

acc aaa ccc gac tcg tac ccg ctg ttc gac ggc atc ttc tgc agc tcc 288
Thr Lys Pro Asp Ser Tyr Pro Leu Phe Asp Gly Ile Phe Cys Ser Ser
          85             90             95

tct aac ttc ttg ggc atc tcg ttc ttg ttg atc ctc atg ttg atc ttg 336
Ser Asn Phe Leu Gly Ile Ser Phe Leu Leu Ile Leu Met Leu Ile Leu
          100             105             110

tac agc ttc att taa taa 354
Tyr Ser Phe Ile
      115
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 Asn Ser Gly Cys Phe Arg His Leu Asp Glu Arg Glu Glu Cys Lys Cys  
 20 25 30  
 Leu Leu Asn Tyr Lys Gln Glu Gly Asp Lys Cys Val Glu Asn Pro Asn  
 35 40 45  
 Pro Thr Cys Asn Glu Asn Asn Gly Gly Cys Asp Ala Asp Ala Lys Cys  
 50 55 60  
 Thr Glu Glu Asp Ser Gly Ser Asn Gly Lys Lys Ile Thr Cys Glu Cys  
 65 70 75 80  
 Thr Lys Pro Asp Ser Tyr Pro Leu Phe Asp Gly Ile Phe Cys Ser Ser  
 85 90 95  
 Ser Asn Phe Leu Gly Ile Ser Phe Leu Leu Ile Leu Met Leu Ile Leu  
 100 105 110  
 Tyr Ser Phe Ile  
 115

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<210> 6  
 <211> 342  
 <212> DNA  
 <213> Plasmodium falciparum

<400> 6  
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 catttagatg aaagagaaga atgtaaatgt ttatttaaatt acaaacaaga aggtgataaa 120  
 tgtgttgaaa atccaaatcc tacttgtaac gaaaataatg gtggatgtga tgcagatgcc 180  
 aaatgtaccg aagaagattc aggtagcaac ggaaagaaaa tcacatgtga atgtactaaa 240  
 cctgattctt atccactttt cgatgggtatt ttctgcagtt cctctaactt cttaggaata 300  
 tcattcttat taatactcat gttaatatta tacagtttca tt 342

<210> 7  
 <211> 387  
 <212> DNA  
 <213> Plasmodium falciparum

<220>  
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 <222> (1)..(387)

<400> 7

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Met	Lys	Ala	Leu	Leu	Phe	Leu	Phe	Ser	Phe	Ile	Phe	Phe	Val	Thr	Lys	
1				5				10					15			

gaa	ttc	aac	atc	tcg	cag	cac	caa	tgc	gtg	aaa	aaa	caa	tgt	ccc	gag	96
Glu	Phe	Asn	Ile	Ser	Gln	His	Gln	Cys	Val	Lys	Lys	Gln	Cys	Pro	Glu	
			20					25					30			

gaa	ttc	aac	atc	tcg	cag	cac	caa	tgc	gtg	aaa	aaa	caa	tgt	ccc	gag	144
Glu	Phe	Asn	Ile	Ser	Gln	His	Gln	Cys	Val	Lys	Lys	Gln	Cys	Pro	Glu	
		35					40					45				

aac	tct	ggc	tgt	ttc	aga	cac	ttg	gac	gag	aga	gag	gag	tgt	aaa	tgt	192
Asn	Ser	Gly	Cys	Phe	Arg	His	Leu	Asp	Glu	Arg	Glu	Glu	Cys	Lys	Cys	
	50					55					60					

ctg	ctg	aac	tac	aaa	cag	gag	ggc	gac	aag	tgc	gtg	gag	aac	ccc	aac	240
Leu	Leu	Asn	Tyr	Lys	Gln	Glu	Gly	Asp	Lys	Cys	Val	Glu	Asn	Pro	Asn	
65					70					75					80	

ccg	acc	tgt	aac	gag	aac	aac	ggc	ggc	tgt	gac	gca	gac	gcc	aaa	tgc	288
Pro	Thr	Cys	Asn	Glu	Asn	Asn	Gly	Gly	Cys	Asp	Ala	Asp	Ala	Lys	Cys	
			85						90					95		

acc	gag	gag	gac	tcg	ggc	agc	aac	ggc	aag	aaa	atc	acg	tgt	gag	tgt	336
Thr	Glu	Glu	Asp	Ser	Gly	Ser	Asn	Gly	Lys	Lys	Ile	Thr	Cys	Glu	Cys	
			100					105					110			

acc	aaa	ccc	gac	tcg	tac	ccg	ctg	ttc	gac	ggc	atc	ttc	tgc	agc	taa	384
Thr	Lys	Pro	Asp	Ser	Tyr	Pro	Leu	Phe	Asp	Gly	Ile	Phe	Cys	Ser		
		115					120					125				

taa																387
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<210> 8

<211> 127

<212> PRT

<213> Plasmodium falciparum

<400> 8

Met	Lys	Ala	Leu	Leu	Phe	Leu	Phe	Ser	Phe	Ile	Phe	Phe	Val	Thr	Lys	
1				5				10					15			
Glu	Phe	Asn	Ile	Ser	Gln	His	Gln	Cys	Val	Lys	Lys	Gln	Cys	Pro	Glu	
			20					25				30				
Glu	Phe	Asn	Ile	Ser	Gln	His	Gln	Cys	Val	Lys	Lys	Gln	Cys	Pro	Glu	
		35					40					45				

Asn	Ser	Gly	Cys	Phe	Arg	His	Leu	Asp	Glu	Arg	Glu	Glu	Cys	Lys	Cys
50						55					60				
Leu	Leu	Asn	Tyr	Lys	Gln	Glu	Gly	Asp	Lys	Cys	Val	Glu	Asn	Pro	Asn
65					70					75					80
Pro	Thr	Cys	Asn	Glu	Asn	Asn	Gly	Gly	Cys	Asp	Ala	Asp	Ala	Lys	Cys
				85					90					95	
Thr	Glu	Glu	Asp	Ser	Gly	Ser	Asn	Gly	Lys	Lys	Ile	Thr	Cys	Glu	Cys
			100					105					110		
Thr	Lys	Pro	Asp	Ser	Tyr	Pro	Leu	Phe	Asp	Gly	Ile	Phe	Cys	Ser	
	115						120					125			

<210> 9

<211> 330

<212> DNA

<213> Plasmodium falciparum

<220>

<221> CDS

<222> (1)..(330)

<400> 9

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Glu	Thr	Glu	Ser	Tyr	Lys	Gln	Leu	Val	Ala	Asn	Val	Asp	Glu	Phe	Asn	
1				5				10						15		
atc	tcg	cag	cac	caa	tgc	gtg	aaa	aaa	caa	tgt	ccc	gag	aac	tct	ggc	96
Ile	Ser	Gln	His	Gln	Cys	Val	Lys	Lys	Gln	Cys	Pro	Glu	Asn	Ser	Gly	
			20				25						30			
tgt	ttc	aga	cac	ttg	gac	gag	aga	gag	gag	tgt	aaa	tgt	ctg	ctg	aac	144
Cys	Phe	Arg	His	Leu	Asp	Glu	Arg	Glu	Glu	Cys	Lys	Cys	Leu	Leu	Asn	
		35					40					45				
tac	aaa	cag	gag	ggc	gac	aag	tgc	gtg	gag	aac	ccc	aac	ccg	acc	tgt	192
Tyr	Lys	Gln	Glu	Gly	Asp	Lys	Cys	Val	Glu	Asn	Pro	Asn	Pro	Thr	Cys	
	50					55					60					
aac	gag	aac	aac	ggc	ggc	tgt	gac	gca	gac	gcc	aaa	tgc	acc	gag	gag	240
Asn	Glu	Asn	Asn	Gly	Gly	Cys	Asp	Ala	Asp	Ala	Lys	Cys	Thr	Glu	Glu	
65				70						75					80	
gac	tcg	ggc	agc	aac	ggc	aag	aaa	atc	acg	tgt	gag	tgt	acc	aaa	ccc	288
Asp	Ser	Gly	Ser	Asn	Gly	Lys	Lys	Ile	Thr	Cys	Glu	Cys	Thr	Lys	Pro	
				85				90						95		
gac	tcg	tac	ccg	ctg	ttc	gac	ggc	atc	ttc	tgc	agc	taa	taa			330
Asp	Ser	Tyr	Pro	Leu	Phe	Asp	Gly	Ile	Phe	Cys	Ser					

100

105

110

<210> 10  
 <211> 108  
 <212> PRT  
 <213> Plasmodium falciparum

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 Glu Thr Glu Ser Tyr Lys Gln Leu Val Ala Asn Val Asp Glu Phe Asn  
   1                  5                  10                  15  
 Ile Ser Gln His Gln Cys Val Lys Lys Gln Cys Pro Glu Asn Ser Gly  
                   20                  25                  30  
 Cys Phe Arg His Leu Asp Glu Arg Glu Glu Cys Lys Cys Leu Leu Asn  
           35                  40                  45  
 Tyr Lys Gln Glu Gly Asp Lys Cys Val Glu Asn Pro Asn Pro Thr Cys  
           50                  55                  60  
 Asn Glu Asn Asn Gly Gly Cys Asp Ala Asp Ala Lys Cys Thr Glu Glu  
   65                  70                  75                  80  
 Asp Ser Gly Ser Asn Gly Lys Lys Ile Thr Cys Glu Cys Thr Lys Pro  
                   85                  90                  95  
 Asp Ser Tyr Pro Leu Phe Asp Gly Ile Phe Cys Ser  
                   100                  105

B<sup>2</sup>  
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<210> 11  
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 Val Pro Gln Gly Ile Asn Glu Tyr Asp Val Val Tyr Ile Lys Pro Leu  
           20                  25                  30

Ala	Gly	Met	Tyr	Lys	Thr	Ile	Lys	Lys	Pro	Leu	Glu	Asn	His	Val	Asn	
		35					40					45				
Ala	Leu	Asn	Thr	Asn	Ile	Ile	Asp	Met	Leu	Asp	Ser	Arg	Leu	Lys	Lys	
	50				55						60					
Arg	Asn	Tyr	Phe	Leu	Asp	Val	Leu	Asn	Ser	Asp	Leu	Asn	Pro	Tyr	Ser	
	65				70					75					80	
Ile	Pro	His	Ser	Gly	Glu	Tyr	Ile	Ile	Lys	Asp	Pro	Tyr	Lys	Leu	Leu	
				85					90					95		
Asp	Leu	Glu	Lys	Lys	Lys	Leu	Leu	Gly	Ser	Tyr	Lys	Tyr	Ile	Gly	Ala	
			100					105					110			
Ser	Val	Asp	Lys	Asp	Met	Val	Thr	Ala	Asn	Asp	Gly	Leu	Ala	Tyr	Tyr	
		115					120					125				
Gln	Lys	Met	Gly	Asp	Leu	Tyr	Lys	Lys	His	Leu	Asp	Glu	Val	Asn	Ala	
	130					135					140					
Cys	Ile	Lys	Glu	Val	Glu	Ala	Asn	Ile	Asn	Lys	His	Asp	Glu	Glu	Ile	
	145				150					155					160	
Lys	Lys	Ile	Gly	Ser	Glu	Ala	Ser	Lys	Ala	Asn	Asp	Lys	Asn	Gln	Leu	
				165					170					175		
Asn	Ala	Lys	Lys	Glu	Glu	Leu	Gln	Lys	Tyr	Leu	Pro	Phe	Leu	Ser	Ser	
			180					185					190			
Ile	Gln	Lys	Glu	Tyr	Ser	Thr	Leu	Val	Asn	Lys	Val	His	Ser	Tyr	Thr	
		195					200					205				
Asp	Thr	Leu	Lys	Lys	Ile	Ile	Asn	Asn	Cys	Gln	Ile	Glu	Lys	Lys	Glu	
	210					215					220					
Thr	Glu	Thr	Ile	Val	Asn	Lys	Leu	Glu	Asp	Tyr	Ser	Lys	Met	Asp	Glu	
	225				230					235					240	
Glu	Leu	Asp	Val	Tyr	Lys	Gln	Ser	Lys	Lys	Glu	Asp	Asp	Val	Lys	Ser	
				245					250					255		
Ser	Gly	Leu	Leu	Glu	Lys	Leu	Met	Asn	Ser	Lys	Leu	Ile	Asn	Gln	Glu	
			260					265					270			
Glu	Ser	Lys	Lys	Ala	Leu	Ser	Glu	Leu	Leu	Asn	Val	Gln	Thr	Gln	Met	
		275					280					285				
Leu	Asn	Met	Ser	Ser	Glu	His	Arg	Cys	Ile	Asp	Thr	Asn	Val	Pro	Glu	



290

295

300

Asn Ala Ala Cys Tyr Arg Tyr Leu Asp Gly Thr Glu Glu Trp Arg Cys  
 305 310 315 320

Leu Leu Tyr Phe Lys Glu Asp Ala Gly Lys Cys Val Pro Ala Pro Asn  
 325 330 335

Met Thr Cys Lys Asp Lys Asn Gly Gly Cys Ala Pro Glu Ala Glu Cys  
 340 345 350

Lys Met Asn Asp Lys Asn Glu Ile Val Cys Lys Cys Thr Lys Glu Gly  
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Ser Glu Pro Leu Phe Glu Gly Val Phe Cys Ser  
 370 375

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&lt;211&gt; 380

&lt;212&gt; PRT

&lt;213&gt; Plasmodium vivax-like sp.

&lt;220&gt;

&lt;223&gt; Amino Acids 1-140-REGION I

&lt;220&gt;

&lt;223&gt; Amino Acids 141-178-REGION II

&lt;220&gt;

&lt;223&gt; Amino Acids 179-283-REGION III

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&lt;223&gt; Amino Acids 284-380-REGION IV

&lt;400&gt; 12

Asp Gln Val Thr Thr Gly Glu Ala Glu Ser Glu Ala Pro Glu Ile Leu  
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Val Pro Ala Gly Ile Ser Asp Tyr Asp Val Val Tyr Leu Lys Pro Leu  
 20 25 30

Ala Gly Met Tyr Lys Thr Ile Lys Lys Gln Leu Glu Asn His Val Asn  
 35 40 45

Ala Phe Asn Thr Asn Ile Thr Asp Met Leu Asp Ser Arg Leu Lys Lys  
 50 55 60

Arg Asn Tyr Phe Leu Glu Val Leu Asn Ser Asp Leu Asn Pro Phe Lys

65						70						75						80
Tyr	Ser	Pro	Ser	Gly	Glu	Tyr	Ile	Ile	Lys	Asp	Pro	Tyr	Lys	Leu	Leu			
				85					90					95				
Asp	Leu	Glu	Lys	Lys	Lys	Lys	Leu	Leu	Gly	Ser	Tyr	Lys	Tyr	Ile	Gly			
			100					105					110					
Ala	Ser	Ile	Asp	Lys	Asp	Leu	Ala	Thr	Ala	Asn	Asp	Gly	Val	Thr	Tyr			
		115					120					125						
Tyr	Asn	Lys	Met	Gly	Glu	Leu	Tyr	Lys	Thr	His	Leu	Thr	Ala	Val	Asn			
	130					135					140							
Glu	Glu	Val	Lys	Lys	Val	Glu	Ala	Asp	Ile	Lys	Ala	Glu	Asp	Asp	Lys			
145					150					155					160			
Ile	Lys	Lys	Ile	Gly	Ser	Asp	Ser	Thr	Lys	Thr	Thr	Glu	Lys	Thr	Gln			
				165					170					175				
Ser	Met	Ala	Lys	Lys	Ala	Glu	Leu	Glu	Lys	Tyr	Leu	Pro	Phe	Leu	Asn			
			180					185					190					
Ser	Leu	Gln	Lys	Glu	Tyr	Glu	Ser	Leu	Val	Ser	Lys	Val	Asn	Thr	Tyr			
		195					200					205						
<sup>2</sup> Thr	Asp	Asn	Leu	Lys	Lys	Val	Ile	Asn	Asn	Cys	Gln	Leu	Glu	Lys	Lys			
<i>B</i> <i>cont.</i>	210					215					220							
Glu	Ala	Glu	Ile	Thr	Val	Lys	Lys	Leu	Gln	Asp	Tyr	Asn	Lys	Met	Asp			
225					230					235					240			
Glu	Lys	Leu	Glu	Glu	Tyr	Lys	Lys	Ser	Glu	Lys	Lys	Asn	Glu	Val	Lys			
				245					250					255				
Ser	Ser	Gly	Leu	Leu	Glu	Lys	Leu	Met	Lys	Ser	Lys	Leu	Ile	Lys	Glu			
			260					265					270					
Asn	Glu	Ser	Lys	Glu	Ile	Leu	Ser	Gln	Leu	Leu	Asn	Val	Gln	Thr	Gln			
		275					280					285						
Leu	Leu	Thr	Met	Ser	Ser	Glu	His	Thr	Cys	Ile	Asp	Thr	Asn	Val	Pro			
		290				295					300							
Asp	Asn	Ala	Ala	Cys	Tyr	Arg	Tyr	Leu	Asp	Gly	Thr	Glu	Glu	Trp	Arg			
305					310					315					320			
Cys	Leu	Leu	Thr	Phe	Lys	Glu	Glu	Gly	Gly	Lys	Cys	Val	Pro	Ala	Ser			
				325					330					335				

Asn Val Thr Cys Lys Asp Asn Asn Gly Gly Cys Ala Pro Glu Ala Glu  
 340 345 350  
 Cys Lys Met Thr Asp Ser Asn Lys Ile Val Cys Lys Cys Thr Lys Glu  
 355 360 365  
 Gly Ser Glu Pro Leu Phe Glu Gly Val Phe Cys Ser  
 370 375 380

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 <213> Plasmodium vivax-like sp.

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<220>  
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 <223> Amino Acids 179-283-REGION III

<220>  
 <223> Amino Acids 284-380-REGION IV

<400> 13

Asp Gln Val Thr Thr Gly Glu Ala Glu Ser Glu Ala Pro Glu Ile Leu  
 1 5 10 15  
 Val Pro Ala Gly Ile Ser Asp Tyr Asp Val Val Tyr Leu Lys Pro Leu  
 20 25 30  
 Ala Gly Met Tyr Lys Thr Ile Lys Lys Gln Leu Glu Asn His Val Asn  
 35 40 45  
 Ala Phe Asn Thr Asn Ile Thr Asp Met Leu Asp Ser Arg Leu Lys Lys  
 50 55 60  
 Arg Asn Tyr Phe Leu Glu Val Leu Asn Ser Asp Leu Asn Pro Phe Lys  
 65 70 75 80  
 Tyr Ser Ser Ser Gly Glu Tyr Ile Ile Lys Asp Pro Tyr Lys Leu Leu  
 85 90 95  
 Asp Leu Glu Lys Lys Lys Lys Leu Ile Gly Ser Tyr Lys Tyr Ile Gly  
 100 105 110

Ala	Ser	Ile	Asp	Met	Asp	Leu	Ala	Thr	Ala	Asn	Asp	Gly	Val	Thr	Tyr	
		115					120					125				
Tyr	Asn	Lys	Met	Gly	Glu	Leu	Tyr	Lys	Thr	His	Leu	Asp	Gly	Val	Lys	
	130					135					140					
Thr	Glu	Ile	Lys	Lys	Val	Glu	Asp	Asp	Ile	Lys	Lys	Gln	Asp	Glu	Glu	
145					150					155					160	
Leu	Lys	Lys	Leu	Gly	Asn	Val	Asn	Ser	Gln	Asp	Ser	Lys	Lys	Asn	Glu	
				165					170					175		
Phe	Ile	Ala	Lys	Lys	Ala	Glu	Leu	Glu	Lys	Tyr	Leu	Pro	Phe	Leu	Asn	
		180						185					190			
Ser	Leu	Gln	Lys	Glu	Tyr	Glu	Ser	Leu	Val	Ser	Lys	Val	Asn	Thr	Tyr	
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Thr	Asp	Asn	Leu	Lys	Lys	Val	Ile	Asn	Asn	Cys	Gln	Leu	Glu	Lys	Lys	
	210					215					220					
Glu	Ala	Glu	Ile	Thr	Val	Lys	Lys	Leu	Gln	Asp	Tyr	Asn	Lys	Met	Asp	
225					230					235					240	
Glu	Lys	Leu	Glu	Glu	Tyr	Lys	Lys	Ser	Glu	Lys	Lys	Asn	Glu	Val	Lys	
			245						250					255		
Ser	Ser	Gly	Leu	Leu	Glu	Lys	Leu	Met	Lys	Ser	Lys	Leu	Ile	Lys	Glu	
			260					265					270			
Asn	Glu	Ser	Lys	Glu	Ile	Leu	Ser	Gln	Leu	Leu	Asn	Val	Gln	Thr	Gln	
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Leu	Leu	Thr	Met	Ser	Ser	Glu	His	Thr	Cys	Ile	Asp	Thr	Asn	Val	Pro	
		290				295					300					
Asp	Asn	Ala	Ala	Cys	Tyr	Arg	Tyr	Leu	Asp	Gly	Thr	Glu	Glu	Trp	Arg	
305					310					315					320	
Cys	Leu	Leu	Thr	Phe	Lys	Glu	Glu	Gly	Gly	Lys	Cys	Val	Pro	Ala	Ser	
				325					330					335		
Asn	Val	Thr	Cys	Lys	Asp	Asn	Asn	Gly	Gly	Cys	Ala	Pro	Glu	Ala	Glu	
			340					345					350			
Cys	Lys	Met	Thr	Asp	Ser	Asn	Lys	Ile	Val	Cys	Lys	Cys	Thr	Lys	Glu	
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375

380

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 <223> Amino Acids 126-197-REGION III

<220>  
 <223> Amino Acids 198-281-REGION IV

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Pro Gly Ile Tyr Asp Val Val Tyr Lys Pro Leu Ala Gly Met Tyr Lys  
                           20                          25                          30

Thr Ile Lys Lys Leu Glu Asn His Val Asn Ala Asn Thr Asn Ile Asp  
                           35                          40                          45

Met Leu Asp Ser Ala Leu Lys Lys Ala Asn Tyr Phe Leu Val Leu Asn  
           50                          55                          60

Ser Asp Leu Asn Pro Ser Gly Glu Tyr Ile Ile Lys Asp Pro Tyr Lys  
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Leu Leu Asp Leu Glu Lys Lys Lys Leu Gly Ser Tyr Lys Tyr Ile Gly  
                           85                          90                          95

Ala Ser Asp Asp Thr Ala Asn Asp Gly Tyr Tyr Lys Met Gly Leu Tyr  
                           100                          105                          110

Lys His Leu Val Lys Val Glu Ile Asp Lys Lys Gly Lys Ala Lys Lys  
           115                          120                          125

Glu Leu Lys Tyr Leu Pro Phe Leu Ser Gln Lys Glu Tyr Leu Val Lys

130

135

140

Val Tyr Thr Asp Leu Lys Lys Ile Asn Asn Cys Gln Glu Lys Lys Glu  
145 150 155 160

Glu Val Lys Leu Asp Tyr Lys Met Asp Glu Leu Tyr Lys Ser Lys Val  
165 170 175

Lys Ser Ser Gly Leu Leu Glu Lys Leu Met Ser Lys Leu Ile Glu Ser  
180 185 190

Lys Leu Ser Leu Leu Asn Val Gln Thr Gln Leu Met Ser Ser Glu His  
195 200 205

Cys Ile Asp Thr Asn Val Pro Asn Ala Ala Cys Tyr Arg Tyr Leu Asp  
210 215 220

Gly Thr Glu Glu Trp Arg Cys Leu Leu Phe Lys Glu Gly Lys Cys Val  
225 230 235 240

Pro Ala Asn Thr Cys Lys Asp Asn Gly Gly Cys Ala Pro Glu Ala Glu  
245 250 255

Cys Lys Met Asp Asn Ile Val Cys Lys Cys Thr Lys Glu Gly Ser Glu  
260 265 270

<sup>63</sup>  
Pro Leu Phe Glu Gly Val Phe Cys Ser  
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Leu Asn Val Gln Thr Gln  
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